PUBLIC HEARING

BEFORE THE

CALIFORNIA ENERGY RESOURCES CONSERVATION

AND DEVELOPMENT COMMISSION

In the Matter of:)
)
2001 BUILDING ENERGY EFFICIENCY)
STANDARDS - DUCT TAPE - AB-970)
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CALIFORNIA ENERGY COMMISSION

HEARING ROOM A

1516 NINTH STREET

SACRAMENTO, CALIFORNIA

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10:20 A.M.

Reported by:
Peter Petty
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COMMISSIONERS, ADVISORS PRESENT

Arthur Rosenfeld, Commissioner

Rosella Shapiro, Advisor

STAFF AND CONSULTANTS PRESENT

William Pennington

Valerie Hall

Elaine Hebert

Max Sherman
Iain Walker
Lawrence Berkeley National Laboratory

John Proctor
Proctor Engineering Group

ALSO PRESENT

Cliff Schroeder
CASCO

John Taecker
Underwriters Laboratories, Inc.

Danny Walsh
Danny Walsh & Associates

Jerry M. Serra
Tyco Adhesives

Bob Turner
Shurtape

Thomas Trimberger
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Jack Dillon
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Robert E. Raymer
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ALSO PRESENT

Gary Fernstrom
Pacific Gas and Electric Company

Michael S. Day
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Energy Consulting Service

I N D E X

P R O C E E D I N G S

10:20 a.m.

COMMISSIONER ROSENFELD: Good morning, everybody. I'm Commissioner Rosenfeld; I'm actually not the Chair of the Energy Efficiency Committee; that's Robert Pernell, who has a sore back and isn't going to be able to make it. And so I'm pinch-hitting. And I'm not going to do much except take very good notes, so I'm going to turn it over right now to Bill Pennington.

MR. PENNINGTON: Okay, thank you. I'm Bill Pennington; I'm the worker bee on this project right now for the Energy Commission.

The purpose of today's meeting is to have an opportunity for people to comment on what's termed the express terms. That is language that has been made available to the public to respond to the petition for rulemaking that Tyco submitted along with Shurtape.

I wanted to start by just kind of talking about the express terms for a couple of minutes here. There is a document on the table out there that says express terms at the top, and it has some colors splashed on it here and there that I'd like to call to your attention.

And the first page of that is the regulatory language that would be amended. I can say at the outset that the Commission tried very hard not to say that this was proposed language in putting this out. That basically the Commission was trying to put out language that potentially was responsive to Tyco's concerns, but at the point of putting it out, was taking no position relative to the merits of that.

So, this is language for consideration is basically what it is, rather than saying it's proposed language. And we're very open to comments that different members of the public have on this language, modifying it or whatever.

On this three-page handout, the back two pages come out of a document called the initial statement of reasons, which is a document that the Energy Commission files to start a rulemaking. Any regulatory agency has to file an initial statement of reasons. And that document is on the webpage.

The last two pages is an excerpt from that document that has somewhat of the rationale of why this language. And so I just wanted to briefly go through that. And there's an attempt

here to color-code the first page to the second and third pages so you can relate what's written in English to what's in the regulation.

First off, the blue color is indicating that this language would create an exception that would allow cloth-backed rubber adhesive duct tape to be used on specific joints; in particular, buildings, and for a particular time period.

So basically this would be allowed, there would be limitations on this allowance. And the allowance would be that you could use cloth-backed rubber adhesive duct tape without having to use mastic in combination with it.

So the current requirement, if you look at the first page, all of the stuff that is not underlined is what the current regulation says. And the underlined portion is what is changed.

So, basically in section D there, you see that cloth-backed rubber adhesive duct tapes can't be used unless they're in combination with mastic. And so this exception would say you wouldn't have to use mastic for limited situations. Okay, os that's the blue.

The yellow is -- this is pointing to a particular section in the regulation. There's

actually virtually identical requirements relating to the limitation on the use of cloth-backed rubber adhesive duct tape. It occurs in four places in the standards. It occurs in the nonresidential section of the standards in two places; and it occurs in the residential section of the standards in two places.

And the two places for each of those is related to factory-fabricated duct systems and field-fabricated duct systems.

So this language is pointing to only one of those four sections. And it's pointing to the section related to field-fabricated duct systems in low rise residential buildings.

And when Tyco came to the Energy Commission with their petition, with presenting their petition to the Commission, they said that the particular problem that they were concerned about was not being allowed to use duct tape in production housing. And they were asking for the Commission in particular to focus on some remedy for that. So, that's one of the reasons for this only pointing to low rise residential.

Also in nonresidential buildings, you know, a substantial portion of the duct systems

are not flex duct systems. And so, you know, in residential that's the common thing. And in nonresidential it's far more limited that that's the case.

Related to the difference between factory-fabricated and field-fabricated, it's the Commission's information that factory-fabricated systems in general don't use cloth tape. It's our understanding they typically use mastic in their systems. And again on the flex duct to fitting joint they typically use plastic tape. That's our understanding. So that's sort of the rationale for honing in on this one particular section that would create an exception.

The green is a sunset date. And this would allow this exception until January 1st of 2004. In most of the correspondence that the industry has had with the Energy Commission they have proposed some sort of a date out there after which a change wouldn't be in effect.

In general, they've always suggested a longer date, a later date out there. But in the legislative proposal they made there was a four-year time period on the bill. And in previous comments the point was that there's a potential

here for developing a superior product, a superior cloth product. And introducing that into the California market.

The way the Energy Commission heard it, anyway, the basic issue that the industry had was that they couldn't do that overnight, and they needed some time to introduce such a product. And so that's basically the rationale of saying, okay, we want that product, that's important to get an improved product here.

And so this would allot some time to have that come to market. And so that's sort of the purpose of the sunset date.

The way it would work is that after that sunset date the exception would no longer be in place. And you're basically back in the situation with the current requirement.

The fuchsia color is related to the idea that there are installation concerns with using cloth tape. And, you know, that most of the researchers that have been in the field have seen significant problems with installation. And so just allowing cloth tape to be used, you know, we need to address those installation problems.

So basically these items A, B, C, D and

E are specifying what is expected in a very explicit way.

If you dig around the code you actually can find these requirements, you know. They're buried in an appendix of the uniform mechanical code. But basically these are made explicit here, you know, right up front, that this is what's going to be needed to be done. So that was the idea.

And the last sentence, one might view it as redundant, but basically the last sentence is just to reinforce that there are certain joints that cloth tape is not recommended for use by the industry. And that is nowhere communicated in code. And, you know, certainly part of the field research that's been done on this issue has indicated that cloth tape is not infrequently used on joints that the manufacturers don't recommend the cloth tape to be used on. So this is actually putting into code a prohibition against that practice.

So that's basically what I wanted to go over here. Are there any questions about that? I don't want to get into a debate about that, because you'll get your chance. But are there any

questions about any of that? Is anything not clear to you?

Okay. I would suggest that we hear from Max Sherman next.

COMMISSIONER ROSENFELD: Next, can we do that? Thank you.

MR. PENNINGTON: There's a few copies here if anybody's interested.

DR. SHERMAN: What I'm going to talk about today is mostly background that should help make the decisions. We did file comments in December --

(Off-the-record comments.)

DR. SHERMAN: Okay, I got it. We did file comments back in December. Those are in the docket so they're available for everybody. I'm not going to go over those in detail, but I am going to go over the background of what we have done relative to this issue, and where we are in the research that we've been doing.

My name is Max Sherman; I'm from the Lawrence Berkeley Laboratory. My colleague, Iain Walker, is here, as well.

We also have some examples of different things which we can wave around either during the

talk or later.

We have been doing research in this area for quite some time, and the purpose of our testing has been to develop methods for figuring out how long duct sealants might work; how the different types perform to facilitate the development of new standards and to get that information out so that people can use it.

A brief history is that we began doing this in 1995 through the California Institute for Energy Efficiency, because Pacific Gas and Electric wanted to be able to recommend in their own programs which types of sealants should be used on ducts which worked better than others.

And so we were commissioned to come up with a test method that would allow some sort of rating of different sealant methods. Didn't start off to be specifically focused on duct tape, but we looked at all the various sealant methods.

Our first sets of data came out in 1997 and we published that data shortly thereafter. 1999 we came out with a second version of the equipment. I'll show you this in a second. And in the last year or so we've gone through a whole other set of rounds. And we're currently doing

another kind of testing under the PIER funding. And I'll talk about briefly all of these things.

Before I do, I want to point out that there are three basic kinds of joints in a duct system. There's the core-to-collar joint, so that's the inner plastic thing that has the wire and flex duct in it. It attaches to the metal collar. That's normally the primary air sealant joint, and it attaches to the flex duct. So that's an important one.

The second one is where that collar, the metal collar attaches to a plenum or a wire -- or a register. So that's a metal/metal joint, and often at a right-angle joint. That was the joint that we used in most of our testing.

And there's a third joint, and that's the jacket. That's the outer liner of the flex duct, the one over the insulation. That's not usually a primary air sealant, but it is important for longevity of the duct and for moisture controls, so to avoid condensation and to keep the life of it.

All three of those kinds of joints need to be sealed.

Well, why did we use the collar-to-

plenum joint in our testing? First of all, it's the one where the most amount of observed field failures are. Part of the reason is you can see that joint in the field, whereas the core-to-collar joint is hidden and you can't often see it unless it's fallen off.

Second of all, it's the toughest one to seal because it's at an odd angle, it's not a flat-on-flat joint, it's a right-angle joint. So that made it ideal for the kind of testing we wanted to do.

Also, it's easy to quantify, because it starts off, the unsealed version has a well defined leakage because of the finger joints associated with it. So it's easy to quantify.

The kind of testing we're doing is what you might call test-to-failure testing, where we test it until it stops working. And that allows us to compare different products in different environments, and how well they do. Test-to-failure is quite common in structural testing and a lot of other kinds of testing, where you test perhaps beyond what a service life would be in order to get a comparison rate.

This picture is a picture of a plenum

and you can see here, perhaps some of you can see, that there was duct tape at this joint and it's fallen off.

COMMISSIONER ROSENFELD: Can you help us a little by pointing where things --

DR. SHERMAN: Trying to use the pointer on here, it doesn't seem to be working too well.

Okay, that's one of the two joints. There's also one here at the top. See those holes? That's the finger joints where the sealant has come off, the duct tape has come off. You can see the remnants down at the bottom of the duct tape that was there. So, that's a duct tape failure in a core-to-collar -- collar-to-plenum joint.

Okay, the first longevity testing that we did had two parts to it. One was we baked samples at a high temperature, and the other was we cycled them between a high temperature and a low temperature. And they failed often more quickly with this aging one.

We've measured a bunch of surface temperatures. I've given this data before, so I'm not going to go into it in great detail.

We tested different kinds of duct

sealants. We tested all the common duct sealants that we knew about. We tested what we're calling duct tape here, and what we're calling duct tape is normally cloth-backed natural rubber adhesive, the stuff that, you know, we buy at Home Depot or whatever, and use on everything. That's what we're calling duct tape.

Then there's OPP tape, which is oriented polypropylene. That refers to the backing. That's the filmy tapes that you see. Sometimes they're clear, sometimes they're silvered, sometimes you see them as packing tape or they're fiber reinforced. But there's a variety of those kinds of tapes. They have an acrylic sealant, acrylic adhesive.

Then there's a foil tape which also has an acrylic adhesive, yet a foil backing. There are butyl tapes which have a thick butyl rubber adhesive and a foil backing. And then we tested mastic and we tested the aerosol sealant developed at LBL.

So we tested a variety of all these different kinds of things in our testing.

This is a picture of the original test apparatus. The circled section there is actually

the test joint. The rest of it is how we get the hot and cold air pumped to it. We could test this one eight samples at once.

Periodically we would take the test samples out and measure them with great precision; see how leaky they got. And so we would do that in order to get a leakage history.

The basic results were that the duct tapes failed. Whether they were UL181BFX tapes or not, they failed quite quickly. Usually within a matter of a few days. Normally all of them failed within about 60 days. Nothing else failed out to 100 days, which is when we didn't run any tests longer than 100 days.

So the other tapes all passed; the mastic passed and the aerosol passed in various configurations.

The kinds of failures that we observed in the duct tapes were drying or hardening of the adhesive; shrinking of the tape backing, often preferentially different layers appeared to be shrinking, and that led to delamination. The tapes would just, in many cases, pull away or fall off of their own weight.

In some cases because of the cycling the

adhesive would re-harden where the tapes would stay in place and shrink and uncover leaks. So we saw all of these kinds of failures, and we have some examples.

This is a summary table of the backing and the adhesives and the status of it. So the cloth-backed natural rubber adhesive was the things that failed. The acrylic adhesive and the butyl rubber adhesive ones all passed.

But there are other combinations here for which there are currently no products on the market, so therefore we didn't test. So we don't know what are the key reasons they failed. So other combinations might pass or might fail.

The Department of Energy funded a completion of a Mark-2 apparatus, one that would allow ten aging type tests at once, and 18 single temperature tests simultaneously. We repeated the same kinds of tests that we did over again. Repeated it with new products. I think almost all the duct tapes we used in this one were UL181 tapes.

We published reports on this, but basically it's the same results. The duct tapes failed, everything else passed.

Now, at the last time we had a hearing we heard some issues from the industry. One was they wanted us to test the core-to-collar joint rather than the collar-to-plenum joint because this is the only joint for which there are industry recommendations. And there's a recommended configuration.

Also they wanted to know what was good enough. They wanted, rather than a test to fail, they wanted a test to pass that it could show that a product was good enough.

So, we have now funding from PIER to look at these issues. Currently we're running 18 different configurations of a core-to-collar joint in a heating-only mode. We're running it at the highest temperature that we feel comfortable doing in order to accelerate the process, and that temperature is 200 Fahrenheit because that's the maximum operating temperature listed on the products.

And we calculated what it takes to pass, so that at this temperature two years of testing in our apparatus is equal to 30 years in the field, according to our calculations.

So ostensibly it will take us two years

to determine whether these pass. But we're pretty confident that if we use a visual criteria instead of a leakage criteria that we could tell whether or not they would pass in six months.

So, the 18 configurations that we're using involve the industry recommendation, which is two continuous wraps of tape around with strapping. But because we rarely see this configuration in the field despite manufacturers' recommendation, we're doing all the typical variations that we do see in the field. Not a continuous wrap; only one instead of two; and we're doing it without strapping.

So we're testing all these various configurations with four different products. Two duct tapes from two different manufacturers; a foil tape; and an OPP tape.

And the other thing I'll bring up is we use only clean surfaces for these tests and all our tests. Clearly a dirty surface will cause earlier failures. If we knew a good way of reproducibly making a surface dirty we'd check that out, as well.

Because we know in the field surfaces aren't as clean as we get them in the laboratory.

It's a dirty environment. Even if people do a good faith job of wiping off the metal before they put it on, there's still likely to be some dirt. And that could be leading to failures, as well. But we're not testing that.

Okay, we've been running these tests for only one month, so we don't have a lot of detail. We see no additional leakage in the one month. We see some minor visible changes, some wrinkling, a little bit of adhesive oozing. Doesn't look serious yet.

There is one case of the 18 that seems to demonstrate what we would think is a significant, or soon to be significant failure. This is one of our test samples that we took out to measure the leakage. And it's very difficult to see, but in that green circle the duct tape is actually pulling off. It's delaminating into layers. And the white part at the top that you see is where the tape used to be, and that's the adhesive that's left as it's shrinking around.

So this is the only significant fail here that we've seen. Now this is not in the industry configuration. It is not strapped and there's only one wrap around, not two. But this

is the first failure that we've seen.

Our conclusions basically are that you shouldn't use duct tape on the collar-to-plenum joint. It's simply not going to work no matter what you do.

You shouldn't use duct tape unless you can assure that all of the industry recommendations are followed. Maybe when we finish our tests we won't even have that. But right now it's clear that if you don't follow those recommendations of two wraps and strapping you are going to get failures.

Our testing is incomplete. Clearly we need to continue this work to have really good answers, but today this is what we think.

There's some questions that we need more work on like which configurations even in the core-to-collar joint will work, and which ones won't. We have to figure that out because the lab situation and the field situation are very different. We have to make sure that what is going in will work in the field.

And in terms of understanding the failures, we can't tell whether it's natural rubber adhesive or cloth backing that's the key

reason it doesn't -- that the duct tape doesn't work. Because they only come in one combination.

It could be that one or the other is the problem. Or it could be that they're only a problem in combination, we don't know.

And if there are going to be new products that may be designed by the industry with superior performance, we have to figure out a way to qualify those so that they can be used if they do, in fact, perform well.

So these are all open questions for which we're going to have to do some continued testing. We're going to need at least six months more on our core-to-collar joints so we know which configurations and which ones do and don't work.

And while we're doing that we can't test any new products in that configuration because the apparatus is completely utilized.

In terms of new products we can do some collar-to-plenum testing. We have some room for doing that. We don't know, under the new configuration, how long we should test for to get acceptance testing in that mode. I'm sure it's going to be at least 60 days, but we really need to do some more work to develop the criteria.

I want to end with three recommendations that I have based on the express terms. The first one deals really with that unless clause that was in the old language. Unless such tape is used in combination with mastic and draw-bands. I don't think that that is a good qualification. I think it should be deleted.

In some cases, for some of the joints, that's actually going to prove counter-productive. You can't put a draw-band easily on the collar-to-plenum joint.

Putting a draw-band on the jacket seal is probably going to cause more problems than it's going to solve because it's going to put more stress on the joint, make it more likely to tear.

Also, there are no guidance for how to do this even on the core-to-collar joint to do it right. So, I recommend deleting that clause.

The second recommendation is my best guess today is that if the exception language is actually followed it's probably okay, because the twofold wraps and the draw-band will keep the tape from having the kind of failure that we saw already.

However, that's already the regulation.

It's just nobody knows it because -- and so the question is how are you going to enforce it. And that's not an issue for me, but I would be concerned that you have to have sufficient inspection to make sure you're actually getting that.

The second thing is a beaded collar is not always required in the current code. It depends on what the size of the duct and the pressure is. But I think a beaded collar should be required as part of this exception language at all times to keep it from pulling off.

So if we're going to include the exception language you have to do something about inspection. And I would add a beaded collar requirement.

Finally, this recommendation is really more about qualifying new products that the industry might come up with. I think there has to be some sort of mechanism for allowing new products to come. And I made a rough guess here of some language that would allow that.

And basically this language says that you can't use cloth-backed or natural rubber tapes unless the Commission finds that it's okay. And

that's up to the Commission to determine how to do that.

But since it's not clear whether it's the cloth backing or the natural rubber adhesive that's the problem on the failures, other combinations may or may not work.

So I think you need to allow the industry to develop new products and have a mechanism for qualifying them. I don't know how that can most easily be done in the Commission. But I'd recommend finding such a way.

And with that I'll take any questions.

MR. PENNINGTON: Excuse me, you're going to have to come up to a microphone.

(Off-the-record discussion.)

MR. SCHROEDER: I'm Cliff Schroeder with CASCO. I have a number of credentials along this field. I manufacture all of the above items that are here. I invented the flex duct; I sit on the UL Advisory Committee; on ad infinitum.

I've been in the business since 1960. I think you're on the right track, but you made a statement that there's no place, or no recommendation, we have a full book with the ADC that we spent a lot of time and effort on that

fully recommends how this is to be installed.

And my question is how many failures have we had with the cloth-backed tape when it's installed in accordance with the ADC recommendations? Has it been tested that way? I don't see that it would fail.

DR. SHERMAN: Well, we're in the process of doing that testing now. That's the testing that's ongoing, but --

MR. SCHROEDER: But I mean, most --

DR. SHERMAN: -- in terms of in the field I think there are people here who are going to make presentations who have a lot more -- who have seen a lot more houses that I have in the field. And I think they can probably address that better.

But in terms of our lab testing, we are testing that configuration right now.

MR. SCHROEDER: Just in general, you also said that you recommended the beaded collar, just a small -- that's what raised my hand about it. Is that depending on the collar, and the manufacturer decides what the adequacy of the collar is, you can or cannot bead, sometimes it's not good to put a bead because the metal wire

going across the bead, it restricts the bond or the tightness of the tape or mastic to make a full seal. And the higher the pressure the more difficult this becomes if you use a bead.

Therefore, I think the application should be up to the contractor to use sufficient gauge material to maintain the structure of the collar and not to be mandated by a Commission.

MR. PENNINGTON: I might just comment quickly on that. The Air Diffusion Council's guidelines recommends using a beaded collar above a given water gauge. And in fact that water gauge is less than what the California mechanical code water gauge criteria is.

So, I mean one possibility is to defer to the Air Diffusion Council, its qualification level. And I don't know what reaction there might be from the people making the collars. But, you know, at least it seems like it ought to conform to the Air Diffusion Council's recommendations.

MR. SCHROEDER: Well, what are their recommendations, for example, now that I have, my contingency is, I'm on the Committee for UL for UL181C, which is clamps.

Now, they're taking this under full

observation or consideration; it's been four years since they've had a meeting. I requested that they have an identification tab on the band or strapping material so that it would hang out underneath the tape so the inspector could see the band, and it would indeed indicate whether that band is on there or not.

Because when it was recommended by ADC in all their brilliance, I asked them the same question: how can you see the band underneath the outer jacket. And nobody could answer that question.

So that their recommendation of certain items I disagree with. And I still think that as far as the collar and the structure of the collar should be up the contractor; should not be mandated by the state.

And I'm more concerned with the identification of the band, for sure, than I am with whether the band's there or not. Would you believe sometimes people don't put the bands on. You can't find them.

You can't expect a contractor, or I mean inspector, to go up on 20 feet and look up there and see if that band is there.

But if the band is there, and put on properly as ADC recommends, and the second cover, the jacket, is put on, I don't think it will fail. I think that this FX tape is tested by UL, will be quite sufficient. And I think the whole Commission should take the ADC book and recommendation as it stands.

MR. PENNINGTON: That was a question for Max, right?

(Laughter.)

MR. PENNINGTON: Any other questions for Max? And I would like to limit this to questions.

MR. TAECKER: I'll try.

MR. PENNINGTON: You can certainly have your time to come in and express your affirmative statements whenever you -- later in the hearing.

MR. TAECKER: I understand. John Taecker, Associate Manager, Underwriters Laboratories, both in regulatory services and field reports department.

I have a couple questions. First of all on your second slide, under objectives, your third bullet item. You say facilitate development of consensus standards, and then you indicate ASTM.

Does that mean that you believe ASTM is

the only consensus standards process? Or -- what is the --

DR. SHERMAN: Certainly not. We are working with ASTM to come up with a test method that will address longevity. I would expect and hope that UL would consider using such a test method, including such a test method in UL181.

Certainly it's quite common for UL to adopt ASTM test methods as part of their testing and certification. So --

MR. TAECKER: Not necessarily.

DR. SHERMAN: -- I have ASTM there because we are actively working with ASTM right now on test methods.

MR. TAECKER: Well, maybe I should ask it in a different way is that -- or semi-statement, I'm sorry, Bill, but it's sort of in this, is that UL181B and UL181A and UL181 are ANSI standards. Thus they are consensus standards.

We use a standards technical process whereby all stakeholders, all interested stakeholders, whether they be inspectors, manufacturers, other test labs, Energy Commissions, everyone can be involved and be on that Committee.

Has Lawrence Berkeley Labs, have they submitted to that consensus process and to the UL recommendations to the UL181 series of standards any comments? Have they presented any of this information to those consensus standards which are referenced in all of the modeled mechanical codes? And has Lawrence Labs asked or sought to also participate in that standards technical panel?

DR. SHERMAN: We have not yet done any of those things in any formal way. Our approach was to come up with a consensus test method which was independent of the UL standard, which was a test method. And then approach UL about adopting it as part of the suite of tests that they use for UL181.

I'm quite familiar with how ANSI standards work, and the different kinds of standards that they are, and the different standards-writing organizations. So, we understand how these things work. And we do intend, when we get a little bit further in this process, to approach UL to see if there is interest in adopting another test method into the suite of standards.

MR. TAECKER: Have you thought of

involving UL from the beginning?

DR. SHERMAN: Well, UL has been aware of the ASTM process. And, of course, can participate in that open process, as well.

We chose not to work first with UL because that's in a limited environment of UL181. We wanted the generic test method first. First you come up with methods of test, then you come up with ratings. That's the normal way of developing it. And the UL standard is more of a rating standard, whereas the test method for ASTM is going to be exactly that, a test method.

MR. TAECKER: One other question I have is in regarding your recommendation three, that you are suggesting, if I understand this you're suggesting possibly an appropriate longevity requirements. Do you have any idea of what those might be, or is that, you think, is another meeting to discuss, or to review.

I mean because it would seem it's right there, it could be up for interpretation, yes?

DR. SHERMAN: Well, the way it's written right here it would be up to the Commission to determine what those would be. I am not through here proposing a specific set. If this were a

direction the Commission decided to go, perhaps they could be developed more specifically.

This is a general recommendation; obviously the details would have to be worked out if it was desired to go that way.

MS. SHAPIRO: But I wanted to add something. I think we did say at our last hearing last summer that we were looking for longevity that was at least 30 years. As long as the house, you know, -- that we're projecting the life of the house.

So not six months; not five years; not three years. We're looking in the scale like 30 years. This should not be a surprise to anybody.

COMMISSIONER ROSENFELD: In fact, I think we said --

MS. SHAPIRO: Yes, yes, it was Art who said it, Commissioner Rosenfeld who said it. And he said at least 30 years.

(Laughter.)

MR. PENNINGTON: So no other questions for Max. Could we hear from people that want to represent the petitioner? Tyco, Shurtape -- comments.

MR. WALSH: Commissioner, Danny Walsh

for Tyco. Can you hear me okay, Bill?

MR. PENNINGTON: Yeah.

MR. WALSH: I'll speak up. Commissioner, Danny Walsh for Tyco, and with me is Dr. Jerry Serra from Tyco, Bob Turner from Shurtape. We wanted to thank you for the patience you've extended us, particularly Commissioner Pernell and Rosella, for their patience in getting us to a point where we've really got a good dialogue going between Mr. Pennington, Max, LBL and are, you know, frankly at a point where we agree with whatever you're calling it. Bill didn't like to call it a recommendation or a proposal. But I think we're getting very close and had you not pushed us, we wouldn't have gotten there.

We're now down to a point where we need to work out the remaining few issues. One that just appeared yesterday late in the afternoon from the building inspectors, which Dr. Serra will address. And we think we are going to be able to accommodate those concerns. And without taking any more time of the folks next to me, I'm going to turn this over to Dr. Serra. And thank you, again.

DR. SERRA: Good morning, everyone. I'm Jerry Serra with Tyco Adhesives, currently Vice President of R&D. I've been in this business for about coming up to 29 years in November.

So, first of all I want to echo Danny's comments and thank you, especially to the Commissioners and to your staffs for working with us. It's been a long road since June, but I think we have made some progress.

And really it's been because the Commissioner and staff have pushed the industry in a direction that I think you wanted us to go.

We're here to tell you that we support the express terms that you have sent out. And we also want to repeat our position from last time that we absolutely support energy efficiency.

To show our support for the express terms we are prepared to include in each box of tape that's shipped instructions on how to apply it. We are also prepared to print on the cores the key points of the application in the usefulness of the tape.

We are also prepared to hold, at our cost, regional seminars, if you will, on the proper use of tapes for sealing flex ducts. And

we would even consider printing on the backing, itself, certain application instructions. It would be kind of difficult to print the whole thing because it's so busy, but we'll do our best to put the salient points on there.

I would also like to thank Max and Bill for those many long telephone calls working on test methods last fall and through the early winter. We spent a lot of time, and I think again because the Commission -- actually Commissioner Rosenfeld asked us to get together, so we followed your recommendation and we did that.

And I think we are better poised today because we did follow your recommendations. I'd also like to thank Iain for his support and help in getting this done.

I want to mention one thing and then Max also mentioned it, about new products coming down the pike. The way the current language is written, it's fairly restrictive and I think we can work out a way to -- and Max had some suggestions earlier of how to word the standard to allow for other products coming down the pike.

I will tell you that we listened to you; we heard you loud and clear; we heard you want 30

years. We believe we have a product now that will give you 30 years. And we believe we have a test method that will make that prediction, which we are working with LBNL on that test method. And we're in the process of, we are discussing it, and we will stand by the offer we had before, that we'll continue to work with LBNL to get better test methods for products that are used as sealants in the industry.

So, with that I will entertain any questions that any of you might -- oh, one other question, excuse me.

This is really for Max, and I want to clarify something. His testing was run for, I think, 60 days in some cases, or 100 days in another case. That does not -- there's no correlation to 60 days equals five years, equals ten years, equals 20 years or 30 years.

So, I think with the method we have we actually can predict a year, the lifetime of the product. And just to give you the general scope of that, it's based on scientific approach. It's based on taking the actual data, the climate data from whatever part of the country, whatever town, city, state in the United States.

We take the 30-year average of the highs, the lows, the mins, and then we calculate the attic temperatures. We calculate the duct temperatures. After we calculate those, we then plug that into our what I call our plug-in -- model and it will actually come out and predict the lifetime of the product.

So, with that I will entertain any questions that anyone may have.

MS. SHAPIRO: Was that a question for Max?

DR. SERRA: No, it was just a --

MS. SHAPIRO: Oh, okay.

(Parties speaking simultaneously.)

MS. SHAPIRO: Okay.

MR. PENNINGTON: -- clarify a little bit. This test method that Jerry's talking about is not in existence now. It has been developed by Tyco and so it's proposed as a future test that perhaps the industry could achieve consensus around for possible future use, and the reference in the standards.

DR. SERRA: Another point on that test method, it's not something that we pulled out of the air. It's something that we've used, the

principles of it we've been using for years.

And one of our other businesses, a customer asked us to develop a coating that would withstand 120 degrees Centigrade for 20 years. That's roughly 250 degrees Fahrenheit.

The last time I was here I told you that we were successful in doing that. And we are at our, I think it's at the 19-year mark right now, so we're pretty sure that we're going to hit our target.

So that same methodology was used in this; we've also done it in our automotive businesses and we've done it in some other businesses, as well. So we know the model works.

MR. TURNER: Bob Turner with Shurtape. I'd just like to say --

MS. SHAPIRO: Could you just wait for one minute because I think Max is responding to Jerry.

DR. SHERMAN: Well, a quick response and a quick question. The response is Jerry's right; our test method we make no claims that we can turn our results into longevity. Ours is pass/fail; we don't yet know how to do that.

But a question is really one of passing

the hot potato. If you develop this test method, Jerry, do you foresee it going into UL181B?

DR. SERRA: I don't know, Max. We're at the point now where, as you know, we have not shown that to anyone other than your lab and Bill.

So we're at the initial stages; we're looking for input. And I guess my hope would be that this could become standard at some point in the future that would have more ramifications than just for tape.

DR. SHERMAN: Thank you.

MR. PENNINGTON: I guess one thing that brings to my mind is that I'm not sure what is a normal gel time for a proposed change to a UL standard. My guess is three or four years or something like that. But, I don't know.

It seems like we're quite a distance out before we would have this confirmed as a standard practice test.

DR. SERRA: I think you're right, but we're willing to work on that. I think the message that I want everyone to go away with is that the industry heard last June what the state was looking for. And the industry is responding to what those needs are.

But, as you said, it does take time.

MR. TURNER: Yeah, I'd just like to say one quick thing. I'm Bob Turner with Shurtape. I'd like to thank the Commission, and I agree with everything Jerry has said.

Working -- have developed or is in the process of developing some new products, new test procedures that will help the whole industry. We agree.

We do agree with the express terms as written here. And we feel that the testing that we have done with Shurtape also is that the new UL181B affects products when applied according to manufacturers' recommendations, will last 30 years.

MR. PENNINGTON: Thank you.

MS. SHAPIRO: Before you get up I wanted to ask about beaded collars. What do you guys think about the idea of beading should be required as a -- should be in the standards?

MR. TURNER: I don't think I can, you know, here again that would be something I think that the flex duct, or sheetmetal industry or whatever, should be involved in. Because I couldn't answer that question.

MS. SHAPIRO: Jerry, you're not --

DR. SERRA: Yeah, I don't feel qualified to answer that question, either.

MS. SHAPIRO: Thank you.

MR. PENNINGTON: Okay. Mr. Trimberger, could you come up and talk to us?

MR. TRIMBERGER: Hi. I'm Tom Trimberger; I've submitted a letter to the docket on behalf of CALBO opposed to the express terms.

Specifically CALBO's opposed to frequent changes to the standards. We don't want to be enforcing a moving target. And sunset dates are very very difficult to enforce and really hurt the credibility of the energy standards, as a whole.

I work for Sacramento County Building Inspection. We build about -- or we oversee construction of 4400 single family dwellings a year.

Personally, I'm a mechanical engineer by training, which is kind of odd for a building official. In my background I've worked for consulting engineering companies and heating and air contractors doing commercial and residential work.

And I've followed a little bit of this

stuff. I've followed all the AB-970 hearings; all the energy changes for the years. I've been involved since the, I think it's original 1978 energy standards, in some way.

Kind of looking at the way the industry has changed over the years, has really improved itself for these duct connections. Air Diffusion Council came out with their requirements for installing and applying flexible duct, connecting them to cores, to collars. That's helped the industry to understand what's going on.

That little flyer is included in every box of flex duct that gets out to a job site telling them how to install that. Excellent.

In the '94 and '97 uniform mechanical codes they actually took those standards and put them into the installation standards in the mechanical code. Brings that even more into the limelight or the purview of the building official.

We went through a lot of these similar arguments in the AB-970 hearings. You know, which joint are we talking about. Do we go with the UL181 standard. Do we throw in the cloth-backed prohibition or not.

And that was argued through the hearings

and approved. And I guess it's still going on.

Since the AB-970 standards were a real rush process, and I've commended Mr. Pennington and the Commission in the past; I think they've passed a lot of really good stuff in there. You can tell I'm real technical, I say really good stuff.

(Laughter.)

MR. TRIMBERGER: And there's been an enormous amount of training real quick. Southern California Edison Company, PG&E, the utilities all stepped up and did a lot of training. It's ongoing. My Chapter had ongoing training each of the last two months talking about AB-970 energy standards. And making sure that people know what those changes are.

There's a lot of big bullet items for those, you know, you look at the energy efficient glazing, the vinyl duct, vinyl frames and the HERS raters, those are some of the big changes that got into the AB-970 standards that are really taking effect in the industry.

Another one is the prohibition of cloth-backed duct tape. And in my view that's been about the easiest thing to enforce. Since the --

we've been pushing the UL181 for a long time, and that really pushed a lot of people away from the cloth-backed, or the clear plastic vinyl-backed, or whatever, tape.

So by the time the AB-970 standards got out there, most people had already given up or moved from cloth-backed tape. So it really hasn't been a big issue at all in the field. It's pretty easy to enforce, looking at what's there.

But anyway, going back through the ADC instruction insulation standards have all been pretty consistent, too. The inside core takes two wraps and a strap. The outside liner, the outside covering needs two wraps or a strap. It's pretty simple. Hasn't been a whole lot of -- you know, there's maybe some variations here and there, but that's not a real difficult standard.

It's difficult to enforce in that there's a lot of joints in a system; they're up in the air. By the time our inspector gets there, you know, they're covered.

So, anyway, we've done all the training on tight ducts, talking about how important tight ducts are in the standards. And it's a difficult thing to enforce any joint up there. We don't

regularly take joints apart and say, okay, what you got underneath this liner. Did you get two wraps and a strap. But the industry has been moving that way very strongly.

I did hear a previous -- I'm personally kind of happy to see Lawrence Berkeley Lab working with the manufacturers like we just heard on some testing standards that could be appropriate. And the idea of more installation instructions getting out on the job is always welcome.

But i would still stick by my published disagreement with the express terms. We don't need a moving standard. We don't need at all sunset dates. We don't need to say do this, and then don't do it.

I'm involved in training building inspectors, and, you know, it's pretty easy for a building inspector to understand and enforce something that says, you know, do this so no one gets electrocuted. And don't do this because someone might get contaminated drinking water. Those are important issues.

And it takes a little bit more sales to train on energy standards. And I think you'd be taking a big backward step in credibility by

changing again.

You know, I can say changing it before the ink is even dry, but I haven't seen the ink yet.

(Laughter.)

MR. PENNINGTON: It's electronic ink at this point.

MR. TRIMBERGER: I don't see electronic ink. CALBO has, in the past, you know, lobbied again, where's our code books. You know, we can't keep changing. Years ago the criticism of the energy standards was they changed all the time.

Well, they stopped changing all the time and it was good. I don't like seeing this moving target. I don't want to train people don't do that, and then say, okay, well, now you can but only for a little while. You know, they're not going to look for any tape. And the enforcement is going to be worse than it is now. I won't say it's going to be bad, but worse than it is now.

(Laughter.)

MR. TRIMBERGER: So that is essentially my, explains CALBO's position. Thank you.

MS. SHAPIRO: Thank you.

MR. PENNINGTON: Any questions? I have

a couple questions.

COMMISSIONER ROSENFELD: Bill, now you have to talk into the mike. It's my turn to tell you to --

MR. PENNINGTON: Well, I always relax --

MR. TRIMBERGER: Can I have a question first? Where are the code books?

MR. PENNINGTON: Valerie?

(Laughter.)

MR. TRIMBERGER: Well, you know, we want to get that thing printed.

MS. HALL: It's my understanding --

MS. SHAPIRO: Into the mike, Val.

MS. HALL: Thank you. I'm Valerie Hall; I'm the Manager of the Residential Buildings and Appliances Office here at the Commission.

The books, the hard copy version is at the printer. They are being mailed directly to all building departments, possibly as early as next week, probably the first week of April you should actually have them in your hands at that point in time.

It will be a copy of the code book, itself, along with a CD-ROM of the -- or at some point you'll also be getting a CD-ROM of the

standards and the manuals. But the code book will be in your hands either next week or the following.

MR. TRIMBERGER: So that is ten months after everything in effect?

MS. HALL: The hard copy version, yes, that's correct.

MR. TRIMBERGER: Thank you.

MR. PENNINGTON: Okay. You mentioned early on that you're not seeing -- you saw a change of practice to using clear tape from cloth tape that happened, you know, 1998 or something like that, 1999.

A major mechanical contractor in this area uses a factory-fabricated system that uses clear tape, and so that, I would expect that that product you would see the clear tape.

I'm wondering if you see the same thing happening for other contractors that are just doing a field-fabricated job?

MR. TRIMBERGER: Yeah, I've talked to several of them; mostly they're small contractors. And they say, yeah, we switched over a couple years ago.

Originally they weren't, you know, they

were suspicious and stuff that it doesn't look as strong and as tough, but, you know, I think they tried it and you get more on a roll.

MR. PENNINGTON: Okay. Another thing that the manufacturers have suggested that they would be willing to do would be to mark the inside of the roll with some installation instruction; that was one thought.

And another thought was to actually mark the backing of the tape so it would be visible on the installation in some way; you know, maybe say this is prohibited to be used -- anything but the flex duct to get a joint, you know, and that's -- we'd have to come up with something quite simple to make it reasonable to print that, you know, every four feet or ten feet or whatever it would need to be.

Do you see those as positive things?

MR. TRIMBERGER: I see those as very positive, yeah. You know, you write something every four feet on a duct, that's pretty severe way of getting the word out.

You know, I do, you know, even just insulation instructions with the box. Some kind of simple thing.

You know, the industry has been and is still changing. And I think education is really important. That gets the word out to contractors in the field of what does work and what is not allowed.

You know, the code's always said that a duct needs to be substantially air tight. And, boy, we've been looking, you know, over the past couple years, we're re-learning substantially air tight in a big way. And learning, you know, metal-to-metal does not seal. Things like that.

And so I -- very positive. It may become burdensome for them to, you know, try to write a whole lot on the inside of a tube or every four feet on the duct, but, yeah, I see that as positive.

COMMISSIONER ROSENFELD: Actually, Tom, I think Bill's proposal is not that it goes on the duct. You were talking about having it --

MS. SHAPIRO: On the tape.

MR. PENNINGTON: Prints on the tape.

COMMISSIONER ROSENFELD: Let me be very explicit. I think I understand your point. A lot of switching has gone on and you've done a lot of training. And you've got people to back off from

a lousy tape, a duct cloth-backed.

On the other hand, now Tyco and Shurtape have put quite a lot of work into a product which looks like it's as good as anything else.

Supposing they agree that every n feet, and I don't know whether it's two or four or whatever, and on the outside of the tape, itself. So that would take some printing, I understand that. There were some phrase which says, California-approved for collar-to-collar or whatever the words are, so that this new product would then, in some sense, be exempting itself from the prohibition for the traditional old fashioned bad stuff.

Then we wouldn't have to backtrack. I mean that could be ongoing approval until at some stage, I guess, ASTM and underwriters Lab can preempt because they have official test procedures. But what would be your take on that?

MR. TRIMBERGER: I recognize that new products need to come into the market. There's always been real cheap tape on the market and better tape, good tape that worked, hopefully works.

I would strongly, you know, anything

like you said, the mark on the tape -- I did say on the duct -- on the tape, would be welcome, telling what is and is not a proper installation. Because a lot gets done out there, obviously.

I have one thing that hasn't been brought up. We're saying, okay, AB-970 took the cloth-backed out, and now we're saying, okay, maybe we can put some cloth-backed in, but only till 2004, for a year, year and a half, however soon you want to get this into effect.

If it works why are you taking it out again? If you have a product that works why are you sunsetting it out?

MR. PENNINGTON: I think the notion of the sunset is that, you know, based on the testing that Max has done with the new configuration, it looks like if you install that to meet the manufacturers' recommendations, you might have, you know, a fairly satisfactory application.

I think there's quite a bit of uncertainty around that, however. And so what we really would prefer is we would prefer to have an upgrade to the product be done. But that upgrade to the product can't be done instantaneously.

And so I think what -- I mean the key

message that I've gotten from the industry is that they need some time to upgrade the product. How much time is sort of the question. And, you know, in the interim they would like to continue to use their current product, which, you know, they argue that UL181BFX is a superior product to the previously manufactured duct tapes.

So they argue that they've already made one effort to upgrade their product. And they think that if they install that according to their recommendations, and limit it to the joints that they recommend it be used on, that that's satisfactory.

And so this exception is sort of saying, okay, maybe you can view that as satisfactory. But that's not really where California wants to get. California wants to have a superior product that will be lasting 30 summers and won't have to worry about whether or not there's perfect installation out there that they can count on that product, itself, being resistant to installation kinds of problems. So that you can get it on the joint it'll stay there and you don't have to worry about the installation.

So the notion here, this would allow the

manufacturers to continue to use the UL181BFX product on the condition that they limit where it would be used and on the condition that their recommended practices for installation be observed. And now, perhaps, in addition to that, on the condition that they provide installation instructions to the installers and they label on the product that this product is not to be used on the wrong joints.

So that's sort of the whole package here, that that would be in effect for a period of time. But there would be an end to that period of time, because we really want to get to the superior product. And we want the manufacturers to move forward towards bringing the superior product online.

And so after a period of time, even with all these stipulations about using the current product, we want to move to a better product. That's sort of the rationale.

MR. TRIMBERGER: It's hard for me to understand then training other people by saying this is a good product but you can only use it for so long. This is acceptable but we got to stop doing it pretty soon.

You know, you've got projected energy standards change in July 2005, looking at January 2004. Is that necessary? That looks like one question to me. And like I said, you know, I've got to sell this to building officials and contractors and everyone else, we got this here, but it's a sunset date.

I don't like sunset dates at all. And I don't like changes to the standards between cycles. CALBO is very strong against that. And for me to tell building officials, well, we made this ruling, but now we've got an emergency ruling on duct tape. That's kind of a hard sell.

With due respect to manufacturers here, people know a lot more about duct tape than me. I'm not an expert on duct tape. But I'm just telling you what the enforcement side of it is.

I guess I got to that, Dr. Rosenfeld, that you asked me, you know, what my take is. Strongly support anything that they can do to get information out there. In the roll, in the box, on the tape, anything that they can do to promote proper use and better joints. I'd strongly encourage that. Helps the installer, helps the inspector.

Would that satisfy me? I don't think it would.

COMMISSIONER ROSENFELD: -- see a lot of printing on tape as part of the solution. Okay.

MR. PENNINGTON: So are there other questions for Tom?

MS. HEBERT: I'm Elaine Hebert with the Energy Commission. Just a point of clarification, Tom. When you say you've seen the industry moving away from duct tape already before AB-970, are you speaking from what you and your staff are seeing in Sacramento County, or are you speaking for what building officials are reporting across the state, including, you know, say Fresno, San Luis Obispo and souther California?

MR. TRIMBERGER: Probably both. I see it very strongly in my area. But I have heard of it in other areas, also.

MS. HEBERT: Thanks.

MR. DILLON: Jack Dillon, Rottiers Sales Associates. We're the Tyco representative for northern California. And I cover all the way up to Redding and Santa Rosa and also down to Bakersfield.

In this market area there's a contractor

that has the bulk of the market share, and they do use the CASCO product. And that's what you're going to find out there quite a bit.

But in other areas, like for example Redding, there's four contractors up there that I know very well that they don't like the POP product, and they've been using the UL181BFX product.

You go to Reno, same way. Of course, that's a different area, but South Lake Tahoe, Placerville. You get outside the Sacramento area there's a lot of UL181BFX products being used.

Secondly, I've done a lot of building official meetings, and there's a lot of confusion out there. I've done recently, two months ago in Oakland, and then Santa Clara, and this is a hot subject, talking to the building officials. They want to enforce what's out there.

And because of the confusion I think that with this new proposal, or this new terms that would really clarify a lot of things.

We're selling a lot of UL181BFX product in this marketplace and have been. We do sell some of the POP or the plastic product you're talking about. But we still sell a lot of the

UL181BFX.

And using it with a draw-band, that seems to be working very well. And I don't see any other issues with that.

MS. SHAPIRO: So you're seeing a lot of use of cloth-backed duct tape which has been prohibited for close to a year now?

MR. DILLON: Yes. UL181BFX, which is approved cloth-backed duct tape, starting June 1st of last year, if you used that you're supposed to use it in conjunction with mastic.

MS. SHAPIRO: Right.

MR. DILLON: I have not been seeing that, so some have been still using that. The building officials, some are not enforcing that because they're saying it's not enforceable issue. But it's too messy. So some of them are being forced to use the POP or the plastic products.

But we're still, I'm telling you we're selling a lot of UL181BFX. And it's trying to get the building officials to enforce it out there, and that's because there is still confusion out there.

MS. SHAPIRO: Thank you. Bob Raymer -- Bob has been raising his hand --

MR. PENNINGTON: Okay, I'm sorry, I didn't --

MR. RAYMER: Bob Raymer representing California Building Industry Association. I had intended to speak, but sort of along with what Tom had indicated, we support his assertion that probably about three, four years ago there was a rather significant reduction in the use of the cloth-backed tape in our industry; the sort that goes along with the tight duct protocols that we've put together with the LBL and the Energy Commission.

The more that we got out into the field with a rather intensive, it's now a five-year training program that we've been instituting, part of that training was after we get done with the classroom exercise we actually go to some of these production builder sites and actually see how things are being implemented. And then we always do a follow up six months later to see how things have been implemented after the onsite training.

And going back to the mid '90s we were seeing a problem with this product. There's no question. But just because there was a whole lot of other products that were, quite frankly, not

quite as labor intensive, if you follow this it can be labor intensive.

And we've just seen a substantial reduction in its use, I would have to say statewide.

Just as we went into the AB-970 regulations there were two important dates. The June 1st and then December 31st, I didn't get a single complaint from any of our production builders. Believe me, these are people that complain.

(Laughter.)

MR. RAYMER: You know, they're never at a loss for something going -- I think it is a good call on this one. So that tells me that the regs have been implemented, and certainly our largest production builders are very aware of the changes in the standards. That they were interested in. This particular item, it didn't get up on the radar screen.

MS. SHAPIRO: Bob, I have a question that we asked Tom. If there were new products that had cloth back that we had talked about in the June hearing, and they had writing right on the tape that said, okay to use this flex-to-flex

over a collar. Would that be confusing to people? Or would that be --

MR. RAYMER: That type of information is helpful providing that it's accurate, okay.

COMMISSIONER ROSENFELD: Providing what? I just didn't hear --

MS. SHAPIRO: That it's accurate.

COMMISSIONER ROSENFELD: Accurate.

MR. RAYMER: That it's accurate. There were a number of cases in the '80s where a certain pipe was stamped, and I would have to say fraudulently stamped, with an IAPMO-approved stamp. And that led to a number of problems in southern California at military bases.

But as long as it's accurately depicted on the tape that it meets the standard, that's fine. And that can be very useful to the subcontractors.

One of the things here that I don't see really having a problem with this language, the fact is much less of our industry is using the cloth-backed material; and the fact is it is somewhat labor intensive to do this correctly. You've got to do all these things to get this to work right. And is there anything else out there

where you don't have to do this?

And that's a decision, a business decision that somebody's going to make when choosing a product. And so if this gets approved we're going to make sure our membership is made very aware of this exception. But in order to have access to this exception you got to do all of these items.

And my gut feeling is they maybe will stick with the current thing that they're using rather than go back to this. That's just my gut feeling.

MS. SHAPIRO: Thank you.

MR. PENNINGTON: A question, Bob. My understanding is that what BII advocates their training to the largest production builders is to use mastic --

MR. RAYMER: Um-hum.

MR. PENNINGTON: -- and to use it consistently.

MR. RAYMER: Yeah. We're not trying to go after -- we're looking, number one, one of the big questions -- and part of the DOE and CEC contract is that we try to get the largest percentage of production housing so that we access

the largest total number of production units built each year.

And the people attending these will usually have three to four site superintendents with some of their subordinate staff, so we'll have maybe 10 to 12 people in a classroom at a given time.

They're always looking for what can get us the best results at the least cost with the least amount of labor. And so over the time, that's why this product, you know, we're never out there saying use this product only. And we, as a nonprofit association, we can't do that type of thing. But we do indicate that if you want to use this product over here, you've got to do X, Y and Z. If you want to use this product you only have to do X. Obviously, over time, that rings with them. I mean, they have to make a business decision.

So, you're right, I mean the type of information we're getting out to there. And we're also seeing what works well out in the field. You know, as we've gone to some of these sites, at the beginning when we started doing these classes in 1996 we actually went to some that were already

built out and were occupied to do some duct testing.

And goodness, there was a real problem with the installation of this material. They weren't banding it. It was hanging off the ducts, so.

MR. PENNINGTON: Go ahead.

MR. TAECKER: John Taecker, UL, again. I agree with you, Tom, that installation instructions are extremely critical and extremely important to have in the right hands of everybody.

I was curious to know about how you would see -- where to find installation instructions. Right now manufacturers of the air ducts are required, and it is expected by UL and enforced by UL, that there are stuffer sheets in every single box of air duct, every 25-foot length of air duct box, which is essentially pretty much what was handed out.

And then also this very same information is reprinted in 6-3 standard for installation of factory-made air ducts in the mechanical code. Doesn't that provide enough? Or do you think there ought to be other places where instructions also ought to be?

Hate to put you on the spot like that, Tom, but I mean is there any other way we can improve, I guess is my question.

MR. TRIMBERGER: I agree the standard is out there. It's not complicated. I was, you know, I tell people when I train inside, like I said, it's two wraps and a strap. The outside is two wraps or a strap. That's not complicated.

The stuff that I would value to get out there is to say, okay, this is not -- this product is not listed for, you know, this is for connecting a flex duct to a collar. This is not a collar to the metal plenum connection. This is not made for sealing longitudinal seams in a metal rectangular duct. That stuff would be excellent to get out there.

For how to seal the inside of the can, you know, the register box. Some of those locations, how to seal that. That information would be great to get out.

I used to think mastic was the only way to do it. And then I tried to use mastic on a round duct in my house and I got an education. Messy, sloppy, hard to use.

But those are some of the issues that I

would really like to see get out there.

MR. TAECKER: Okay, so if I may further on this is that my understanding -- I must have misunderstood you before. So what basically would be helpful then, for example, if the tape, itself, or the air duct, itself, if it referenced say back to this specific part of the code says, shall be installed in accordance with this particular section of code or something like that, not having to reiterate all of the stuff here, but to make sure that somebody knows they've got to go to this place and only to be installed per that. Would that meet that need of what you're suggesting?

I mean I understand what you're saying, it's --

MR. TRIMBERGER: Yeah, --

MR. TAECKER: -- and I want just one other thing just while thinking on this, is that you're basically wanting to make clear in every way, shape or form, the limitations in the use of product?

MR. TRIMBERGER: Yeah, I think that's it. There certainly isn't a lot of value to reproducing what's already comes in the ADC box, or what's in the standards.

MR. TAECKER: I got it. Okay. Thanks for the clarification.

MR. PENNINGTON: I have a kind of follow up question to that. Do you think that those installation instructions show up on the job site consistently? Or do the boxes get left at the warehouse? What do you think?

MR. TRIMBERGER: For the flex duct? Oh, they're there. They're always there. It's very accessible, you know. If you were doing that with tape, I don't know, you know, sometimes a couple rolls will go to the job site. So you don't get the whole case that when you put one in the case.

Those are very accessible.

MR. TAECKER: And I would say, Bill, that even if the installation instructions, that sheet wasn't there at the job site, everyone can still go back to pulling up the uniform mechanical code. But they can go back to the California mechanical code, which has exactly those same installation instructions, the exact same ones, every single one of them are right here.

MR. PENNINGTON: I think that's well known that that's true. I think there's some other people have some opinions about whether or

not those installation --

MR. TAECKER: Well, whether or not the installation instructions -- I'm not discussing the merits of the content of the installation instructions. At this point I'm just saying that the installation instructions are available in many different venues, is what I'm saying.

MR. PENNINGTON: Okay.

MR. TAECKER: That was all.

MR. FERNSTROM: I'm Gary Fernstrom with the Pacific Gas and Electric Company. As long as we're on the subject of installation instructions, I have one here that fell out of the box.

My wife gives me a hard time about not reading the instructions, anyway. And this print is pretty fine on this installation instruction.

I'll leave it with you, though.

UNIDENTIFIED SPEAKER: That's come out of the box? The flex duct box?

MR. FERNSTROM: Yes.

MR. PENNINGTON: Another question, come on.

DR. SERRA: I'd like to respond to that. What we're proposing is to redo what's already out there. And come in with better language, better

instructions so we don't see this stuff. Okay. Thank you.

MR. PENNINGTON: Okay, I hope you can stick around a little bit. I think there's some other people that, you know, have something to say here that you might be interested in.

John Proctor.

MR. PROCTOR: Commissioner Rosenfeld, Rosella, now I have to use my glasses --

(Laughter.)

MR. PROCTOR: Okay, next slide. What we did is we did two things. We did a survey of manufacturers instructions because while we'd heard that there were -- there was sort of a general feeling that the manufacturers instructions are out there all over the place, and all you have to do is follow them. So we decided that we'd go find them and see what that really meant.

And the second thing we did is we did a phone survey of contractors, 20 contractors; actually now we have about 30 that we've done this phone survey with, but it's only summarized for 20 contractors, on what they report they do with respect to duct tape and sealing ducts.

Okay, next slide. We went to look on, I think the previous slide probably said, you know, we went on the internet, we went to distributors, we went to contractors to see what kind of instructions we could find, and we found absolutely none from the duct tape manufacturers.

So the manufacturers instructions we're speaking of, in the past, and it sounds like in the future it will be different, which I think is an extremely good idea, there were no instructions found. Only disclaimers. And we couldn't find anything on the pressure-sensitive from the pressure-sensitive tape council, either.

With respect to the flex duct manufacturers we did find the instructions. Primarily the Air Diffusion Council instructions.

Okay, next slide, please. You don't have to read all that stuff even if your glasses are on. Basically this is a disclaimer by 3M Company about a product that they call a HVAC duct tape.

And it goes through all this stuff; it tells you, you know, the surface got to be right, and the temperature's got to be right, and everything's got to be right, and you have to

choose what the heck you're going to do because we aren't going to tell you.

So, going back to the manufacturers, the tape people's suggestion to do something different, I love that idea.

As far as the Air Diffusion Council's instructions there are really three or four relevant instructions. First of all there's an instruction to slide at least one inch of core over the collar, pipe or fitting; to tape it with at least two wraps of duct tape; and to secure with a clamp.

And by the way, a footnote says, use clamps as specified in manufacturers UL181 installation instructions. And we couldn't find which manufacturer we're speaking of there, whether it was the clamp or who, but we couldn't find that part.

Can you alt-tab me to the instructions, please. There we go. So these are the instructions. They run side-by-side going down, I think you probably have copies of these.

Side-by-side, one's for a splice, one's for a connection. If you go down to number two, it says essentially the important thing here, what

it says for you to do is to tape the core with at least two wraps -- oh, you have to put it one inch over the collar, and tape it with at least two wraps of duct tape, and secure the clamp.

And that's really the sum of the instructions with respect to the core to the fitting that we're speaking of.

So, let's switch back to the PowerPoint slides, please. Okay, so they don't say a lot of things that we thought they said. They don't say that you need to clean the fitting or collar before taping. They don't say you have to use a continuous piece of duct tape. And they don't say to tape the inner core to the sleeve when joining two sections together.

What they say is you butt, you go over the sleeve and you butt the cores together, and you take the two cores. And I think that's not what we want them to do. I think they actually should be taping to the sleeve.

Okay, next slide, please. It was interesting to note that on one manufacturer's website we found the attachment, or at least a cousin of the attachment that everybody said earlier should never be done. Which is the take

off from a flat piece. And the instructions don't say not to do that.

Okay, next slide, please. Conclusion number one. The manufacturers installation instructions, current manufacturers installation instructions, I believe, are inadequate to insure an air-tight and durable joint.

Next slide, please. The phone survey, 80 percent of the contractors used duct tape where the Air Diffusion Council provided installation instructions. In other words, sleeves and attachments to fittings. Fifty-five percent, by the way, also used it on take offs from plenums where we're generally agreeing it shouldn't be used.

Okay, next slide, please. Twenty-five percent use only tape with no clamp. And 17 percent use single piece of tape wrapped multiple times. That's sort of an interesting statistic, given that there were 20 contractors. I don't know how you get 17 percent. But let's assume we ignore that for a second. It was a little --

(Laughter.)

MR. PROCTOR: Seventy-five percent said that the newer tape had held its integrity; said

that they were very satisfied with it. It works well when it's done right, they said. Twenty percent said that it doesn't, the newer tape; they aren't satisfied with the newer tape. It looses adhesion over time; it dries up quickly.

MS. SHAPIRO: John, what do you mean by newer tape?

MR. PROCTOR: Newer tape, what we asked them, and I don't actually have right here the date that we asked them, but we said tapes that, you know, came onto the market, you started using in, I believe, 1998, we said when the UL181B tapes came on the market.

MS. SHAPIRO: But you're talking only about cloth-backed natural rubber tapes?

MR. PROCTOR: That's correct.

MS. SHAPIRO: Right.

MR. PROCTOR: That's correct. Which does, by the way, come up with a different -- 80 percent, was it 80 percent that actually used the tape, did I say? Eighty percent used cloth-backed tape, 10 percent used the clear tape, whatever that neat little designation was. And there's 10 more percent there someplace that -- it's in the survey that you got a copy of.

Okay, next slide, please. The contractors' self-reported behavior shows that some follow the manufacturers' minimal instructions, meaning that they actually put it on where they're supposed to put it and clamp it.

Okay, and very few follow the virtual instructions like don't put it in a place that we didn't tell you not to put it; or clean it before you do it; or those things.

So, I think improved instructions and I mean the question really comes down to to improve instructions, and can we enforce it to the point that we actually get what we want out of the tape.

Our recommendation is the cloth-backed rubber adhesive tape should not be allowed until it's proven to work on duct systems as they are actually installed in California.

I don't want to lighten that recommendation, however, if the Commission were to decide to make the kind of change that they're talking about, I'd like to comment on what should be in it. Okay.

If you were to make a change I think a couple of things should be added, and that is that there should be, in the instructions, mention of

overlapping between the core and the metal piece that you're connecting the two. And that should -- and so that will revise your section C and your section D slightly.

As far as there was one person's comment, wouldn't it be just good enough to reference a code. Listen, the guys who put this stuff up don't read codes. Some of them, frankly, don't read.

UNIDENTIFIED SPEAKER: -- take exception to that.

(Laughter.)

MR. PROCTOR: And so I actually think that the idea of putting it anyplace that they might see it is a really good idea. And even doing it pictorially, perhaps, you know, a revision of what we have here would be an excellent idea.

The last thing I'd like to recommend, or remind people of, what we're trying to deal with here is that distribution losses in the State of California and elsewhere, and over 40 percent of the energy that's going into cooling, and that many of these joints are inaccessible after the house is built. So if we build a bad joint it's

there forever.

Thanks.

MR. PENNINGTON: Are there any questions?

DR. SERRA: What I'd like to propose on behalf of the manufacturers, and we would be very willing because it seems like installation instructions keep coming up. And I opened up saying we would be happy to address that.

What I would like to say that we'd be very willing to do is to draft up a set of application instructions, and then have them reviewed by CEC Staff, John, Bob, Tom, to let them get out and let the people who are going to use this comment. And then once we have consensus then those would become part of the application instructions.

Thank you.

MR. PENNINGTON: Yes?

MR. TURNER: I think one of the other things that is very important we mentioned a moment ago is it's got to get out to the field. We know that. Even with the installation instructions, we strongly recommend that we work with you all out in the field with contractors

showing them, going over the roofs, showing them exactly how it supposed to be used.

We can work with building inspectors; we can -- however you all want to do that. But, when you actually go out in the field and show, it's much better than just putting in a piece of paper.

MR. PENNINGTON: Any other questions for Mr. Proctor? Gary, why don't you go ahead.

MR. FERNSTROM: Thank you. I'm Gary Fernstrom, Senior Project Manager with Pacific Gas and Electric Company in San Francisco.

We serve over 9 million customers that faithfully pay their utility bill every month.

(Laughter.)

MR. FERNSTROM: And for over 50 years we've been helping them try to make effective use of the energy we supply.

About a decade ago we started looking into heating and cooling systems in homes. We contracted with John Proctor, Lawrence Berkeley Lab, and so on. And learned that a major source of energy loss in heating and cooling systems is the failure of the sealing of duct systems.

So, we would like to see this fixed. And we'd like to see it fixed immediately. We've

known fully well for five years that 20 to 30 percent of heating and cooling energy and consequently people's money is being wasted.

So, we've encouraged the Energy Commission to move quickly to adopt language that would resolve this difficulty in the most effective manner.

We think there are two ways possibly to fix it. One is to do as John Proctor has suggested; and that is adopt language that effectively eliminates the use of cloth-backed rubber tape until that tape is demonstrated or changed to work effectively.

It seems like with the interim language that's being proposed we're looking at extending the use of this tape for another couple of years pending field studies and the development of some improved product. That leaves a two-year window of opportunity for more duct systems to fail in the meantime. So we think something needs to be done now.

There are different opportunities for failure. The material, itself, can fail. The wrong material can be used. That's a failure to use the right material. And it can be installed

improperly. Any one of these things can contribute to an ultimate failure in the system.

We think that mastic is less prone to variation in quality as a result of installation. So it's probably the most foolproof system with regard to these three opportunities for failure.

However, if, in the spirit of compromise with the industry, the Commission wants to adopt express terms that would allow the use of cloth-backed rubber tape for another couple of years, we think there are some additional measures that need to be included in order to make the system as foolproof as possible.

Those are that all round ducts should have a bead to prevent the flex duct from slipping off, even after it's banded. Ducts up to 14 inches in diameter should be 26 gauge or heavier. And fittings less than 14 inches in diameter should be 14 gauge. This is to prevent the metal duct from collapsing under the tension of the drawband.

Sleeve fittings should be at least six inches long, and start collars should be at least four inches long. This would give adequate surface area for the tape to adhere to these

collars, as opposed to a short distance which might give inadequate surface area.

And the flexible core should be pulled at least one inch beyond the bead, and secured with the drawband, which a) is placed behind the bead and, b) captures the entire circumference of the flexible core.

We'll submit these recommendations in writing later. But the important points here are that UL tape should be used. The sheetmetal should be of a gauge adequate to support the tension of the drawband. It should be beaded. And there should be a 50 percent overlap.

Now, when you start adding all of these requirements, I think it begins to be an enforcement issue. And it's much easier to see simply whether mastic was used or whether all of these requirements were used in order that we can have confidence that cloth-backed tape will be installed properly.

Thank you.

MR. PENNINGTON: Questions for Mr. Fernstrom? Jerry.

DR. SERRA: Gary, I thought those were great suggestions and I'd like to get those in our

hands whenever you can.

The only comment that -- the comment I would have to make about mastics is that the tape industry, when you look at a duct, you look up there you'll see the UL181B marking right on the duct tape. Mastics, you don't know. You have to go and find the bucket it came from.

So I think the tapes do have that advantage over mastics, in that you certainly, once you look up there you know that you've used a code-approved tape.

Thanks.

MR. PENNINGTON: Are there any other questions? Yeah, please come up.

MR. DAY: Michael Day with Beutler Industries. We do about 20,000 units a year of residential HVAC new construction. We are not currently with field-constructed duct systems; we are not currently using cloth-backed tapes.

But with regards to a couple of things that you'd said, one, I was wondering if the gauges that you were proposing for start collars and for splices you would want to go beyond what is required in the SMACNA standard?

MR. FERNSTROM: Well, I'm not sure how

our recommendation relates to the SMACNA standard. However, this is what we are recommending for our energy efficiency program.

MR. DAY: I believe --

MR. PENNINGTON: -- quite understand you, Michael. You're saying that SMACNA has lower gauge requirements --

MR. DAY: Correct. I'm pretty sure that SMACNA's, I can't quote them off the top of my head, but I'm pretty sure that SMACNA's gauge requirements for start collars are significantly less than what PG&E is recommending.

Also, when you get beyond 16 gauge a lot of the forming machinery has difficulty in working with the heavier gauges. Sixteen gauge is actually pretty stout stuff. And the start collars that are being used are significantly less than that in a lot of applications. And having been in a lot of attics within the last couple years, even with big ones, it's pretty tough with your zip-tie gun to break those, to crush those.

The majority of clamps that are being used are the Panduit style clamps out there, and they tend to have a cut-off mechanism which will chop that prior to the duct starting to collapse.

Plus that, it's a hassle and you don't want to be up in an attic any longer than is necessary.

The second thing --

MR. PENNINGTON: Let me -- just a second. Maybe there should be a different criteria whether you're using a Panduit strap or a, you know, metal, you know, twist --

MR. DAY: Screw clamp.

MR. PENNINGTON: -- screw clamp. That might be something that you talk about. I know Jim O'Bannon was working on this a little bit.

MR. FERNSTROM: I think the potential for the sleeve to collapse a little bit exists in either case. And we didn't recommend anything as heavy as 16 gauge. We were talking about 26 or 24.

MR. DAY: Oh, I'm sorry, I thought I heard 14.

MR. CARPENTER: Oh, no.

(Laughter.)

MR. DAY: That was the first thing that made my heart skip.

MR. FERNSTROM: Okay, I may have inadvertently said 14, but I meant to say 26 and 24.

UNIDENTIFIED SPEAKER: We really meant armor plate.

(Laughter.)

MR. DAY: We've got some decommissioned battleships we could always overhaul.

The second thing is a little bit more of a general comment. I know that there has been a lot of research done on houses in general in California. I know that there's a substantial body of evidence showing that the problem to citizens of the state at large with duct losses.

But I would also think that I would be remiss in not mentioning that there has been a change, and that there are a considerable number of contractors out there that are doing it, especially with factory-connected systems and factory-built systems that have substantially lower leakage rates.

Even in non third-party tested duct systems, we're averaging between 5 and 8 percent without having to do blower-door testing right out of -- just as it comes out of our factory.

And that while that's not exactly germane, I think that it could give the wrong impression if everybody's thinking that all duct

systems leak 40 to 20 percent without special measures. And it just needed to be addressed.

Thank you for your time.

MR. FERNSTROM: That's a good point. I'd like to add that our observations and recommendations don't stem from or don't apply to factory systems.

MR. PENNINGTON: Okay, Mr. Dillon, have you had a chance to make your comments completely? Okay. Mr. Taecker.

MR. TAECKER: John Taecker, Underwriters Laboratories. I think I've said most of what I was going to say, both last June as well as some today.

I would want to add, though, to other things that I've said before, is that I applaud the objectives that were posted on the presentation by Max. And especially I like the objectives of facilitating the development of consensus standards and the objective for technology transfer.

And in that regard I would encourage all interested parties, anyone in this room, to participate on the standards technical panel for ANSI UL181A and 181B, as well as UL181. Because,

again, those are consensus standards. They are under the consensus standards process of ANSI, which is recognized as the consensus process, as a suitable consensus process.

And it consists of people from industry, people who install it, people that make it, people that inspect it, people that regulate it. And so I would encourage people -- and also the people that are in research, such as Lawrence Berkeley.

I also would, especially on the technology transfer is I would -- I've heard a lot of comments today about something wasn't working this way or that way in the field. But I have not heard any of this information coming back to UL directly with specifics, with evidence. All I've heard is -- I've heard a lot of anecdotal items, and I'm sure there's some details in there. I'm sure there's some evidence in there.

But the only way that UL181B or for that matter, any standard, including the California energy standards, are going to change is when there is feedback to the body responsible for that document.

And so I would definitely encourage anyone who has information on specific instances

where something is not working in the field that has UL181BFX on the tape, we definitely need to hear it. Otherwise we can't take action. And so it becomes a circular issue.

So, we definitely respond to them. I work for the field reports department as well, and we are very active in responding to them, and responding to them immediately. So I would encourage those people to contact me.

That's my comments.

MR. PENNINGTON: Questions?

DR. SHERMAN: I just wanted to make the comment that we have been publishing the results of our work on UL181 tape since 1998. So that information has been in peer review journals. It is available for anyone who wants to make sure of it, and UL certainly had full access to that in all the journals.

So the data we have been generating is out there, and is available, if the UL process wants to make use of it.

MR. TAECKER: If I may, Max, I can appreciate that there is -- that you have published various documents and so forth. What I'm asking is that if you feel that there is

information regarding the 181B UL doesn't necessarily go out and read all journals to find all comments regarding every single thing that UL does.

Remembering that UL writes about 800 standards and UL certifies about 17,000 different product categories, that's 17,000 different types of products, so we may have picked up, but I would appreciate -- I'm just encouraging that if you could, in the future, send it directly to me. Send it directly to our staff involved with UL181. That would get far more attention than if it was just simply something that was referenced in a journal. I hate to say it that way, but unfortunately it will get far more attention if it's directed directly to UL.

DR. SHERMAN: Okay, but since you were certainly aware of it by June, last June at the latest, you now know of all those things. So, --

MR. TAECKER: That is correct. And I am just asking that those people who have, such as you, and it's great that you're doing the research and all that, and all that you've done. What I'm just asking is that if they can, anytime there is something that comes up, to send it directly to us

and we will -- we look forward to that type of input, that type of feedback. That's all.

MS. SHAPIRO: John, wait. Don't go away, Max. John, you said you had no evidence of failure of this new type of tape. Right? You had no evidence, nobody had ever submitted anything to you that showed any evidence of failure?

MR. TAECKER: I'm saying that I am not aware of any field report that we have received regarding problems with these types of tapes.

Now, by saying that, you know, that's just a point. It should not be at all construed either direction. That could not be construed as, gee, there's nothing wrong, but then it could not be construed as, hey, you know, --

MS. SHAPIRO: So the things that were in the June hearing that people all had copies of and that were distributed, did you look at those? Did you feel that those were submitted to you?

MR. TAECKER: I looked at those. My staff looked at those, and in all the cases that we had information, it was the product was not used in accordance with the manufacturers' installation instructions.

And so as far as UL was concerned, that

it was not -- it was misuse of the product in those particular instances. And so therefore there was no action we could take.

I did not see, and neither did my staff see any of those situations that would have warranted UL to take any further action.

Now, I'm very interested and I'm glad to see the next generation, if I may say it that way, or your next phase in your research that you're now doing the -- not the collar-to-plenum, but doing the collar-to-collar connections -- collar-to-core.

And if there are failures in that, and that was of the 181BFX tape, then definitely that would be something that we would be taking action. Because that meant the types of installations you were talking about where there was the two wraps of tape and the draw-band, that was as the product is intended to be used. And if that is failing, definitely UL would take the action that would be required to rectify that.

DR. SHERMAN: Let me make two comments. One is we shouldn't think that all UL181BFX tapes are the same. We've tested, even in our too-severe versions, many other 181BFX tapes that seem

to hold fine without the extra -- without the draw-band or the two wraps or all that sort of thing.

The problem is only in the cloth-backed tapes --

MS. SHAPIRO: Right.

DR. SHERMAN: -- cloth-backed rubber adhesive tapes. They all carry the UL181BFX, but they perform very differently in our sets of tests. So, I don't think we should, you know, tar all the --

MS. SHAPIRO: Right.

DR. SHERMAN: -- all those tapes. The second thing was in terms of the information being out there, I think it was almost four years ago in August of 1998, when I first met Jerry, he came to the ACEEE conference representing the pressure-sensitive tape council. And there was a very open session, and people shared all of their experiences there.

So the industry has been aware of this since let's say late 1998. So none of this is a big surprise. It's been going on for quite some time.

MS. SHAPIRO: Thank you.

MR. FERNSTROM: Gary Fernstrom from Pacific Gas and Electric Company. I'd just like to make one closing comment. It's not really a question.

I believe --

(Parties speaking simultaneously.)

(Laughter.)

MR. FERNSTROM: I believe John Proctor pointed out for us that over half, 55 percent, of the contractors he interviewed were installing these materials in a manner that was not recommended by the tape manufacturer.

And Max pointed out that some, if not many, of the cloth-backed rubber tapes failed his test.

So I don't believe it's an issue of getting back to UL and telling them about individual failures. I think we have overwhelming evidence that on account of multiple factors these materials aren't working as we would desire them to work.

MR. TAECKER: Even though it was not a question can I answer it?

(Laughter.)

MR. TAECKER: Even if a product is not,

if I'm understanding you right, not performing well, or not performing the way you're expecting it to, UL still needs the -- would appreciate the feedback to determine whether there is a need for change.

Maybe the change might be so slight as if it might be a change to the installation instructions, or where the instructions are. Or certain markings or something like that that should be considered, that should be required by the standard. Because the standard doesn't just, it's not just on performance tests, but there are also our prescriptive requirements for markings, for installation instructions, for construction of the actual product.

And there may be cases where UL will go, yeah, that's an installation issue, and there's nothing that UL can do about it.

But there are cases where even knowing that can help effect our evaluation of the product.

MR. FERNSTROM: Well, I understand the notion that we can't fix it unless you tell us there's a problem. That's very clear.

However, we have 9 million customers

that usually don't crawl around in their attics or the spaces, crawl spaces, underneath their homes. They don't know about UL tape or not. They may not even be aware that their systems aren't performing correctly.

And I think the obligation lies more on the listing agency to identify the problems, than on the public to necessarily report them.

MR. TAECKER: Interesting. Well, I would say that we don't -- we can only be as good as what we have of input. And I don't think I want to have my staff go crawling around in every single attic and crawl spaces and everyplace around.

And it makes it a circular issue, maybe. But, anyway, I'll take that under advisement. Thank you.

MR. PENNINGTON: Thank you for your patience, Mr. Burt. Your turn.

MR. BURT: I'm Robert Burt representing the Insulation Contractors Association. Our interest in this area is indirect, but very strong. Periodically one of our members installs attic insulation and after a couple of months the homeowner irately calls him and says my bills

didn't go down hardly at all. And inspection usually determines that the cause is duct leaks.

My first comment then goes on to say that of those who have spoken today I strongly support CALBO and Mr. Proctor. And we greatly appreciate PG&E's attention to this matter.

I next go to an anecdote which supports what Mr. Proctor's research. My previous life as an officer in the Army Corps of Engineers, when I was introduced to the problem of construction inspection, one of my briefers told me, you should be aware that from time to time you'll be approached by someone who says he has 20 years experience in construction. And when you closely examine that person you'll find that he has the first year done 20 times.

(Laughter.)

MR. BURT: And that, I think, is quite well illustrated by the findings of Mr. Proctor's survey. People doing the same thing, even though the instructions quite firmly say it's not.

The 20 percent leakage that his survey found, I don't think --by the people who thought they were doing what they should -- I don't think is acceptable.

I will add that we don't find, as an observation, that the construction part of the -- the regular construction builders, the ones that are doing multiple homes, most of them have gotten religion. Our problem is older homes which some of them are being retrofitted. And the homes are done by small constructors. And those are the people who least read new instructions and new details.

So, in summary, we feel that we support the comments of CALBO, Mr. Proctor. We say if there's going to be new and better, let's wait till the new and better is out and has the instructions printed on it, and then change the reg.

Any questions?

MR. PENNINGTON: Okay, thank you. Is there anyone else that would like to speak?

I don't know if you want to talk about process from this point on, or -- the notice of proposed action for this proceeding announced a data of April 17th, at which the full Commission could consider adopting the express terms.

It's pretty obvious to me, and I would guess the Committee feels this, as well, that the

express terms should not be adopted as they stand. And that there probably should be some refinement of them in some way if they're to be adopted at all.

And if there was to be a refinement to be made, then we would need to put out 15-day language which would be basically a revision to this that would allow the public 15 days to comment on the revision.

And since the Commission meets every 14 days, we can't fit 15 days into 14 days, so in general it takes two Commission meetings after the original published adoption date for 15-day language to come back.

So, I don't know what date it is, but it would be somewhere in the middle of May when potentially the Commission could adopt 15-day language.

So, that's --

MS. SHAPIRO: Bill, excuse me. I don't remember if our notice said that there was an absolute closing date for any comments. Do you remember? Was there -- we asked for things in advance of the meeting, but did it say no comments after such-and-such a date?

MR. PENNINGTON: Comments must be allowed until the date of adoption.

MS. SHAPIRO: Okay.

MR. PENNINGTON: And so, you know, it will be --

MS. SHAPIRO: We could comment on the day of adoption, but in some cases we say -- we have a hearing and then we say, okay, people learn new things in the hearing and heard other people, so you now have ten days, two weeks, whatever, to write in comments.

MR. PENNINGTON: Right.

MS. SHAPIRO: I don't think we said that in this notice.

MR. PENNINGTON: We did not say that. Usually we say it at the end of a hearing when someone --

MS. SHAPIRO: I think that would be a good idea to say, that was my point.

MR. PENNINGTON: Yeah. If there are written comments, it would be very desirable to get them within one week. I think the Committee is going to want to try to make a decision soon. And so if we have to wait another week or longer than that, until we can start deliberating on the

full information, that's just a delaying factor.

So, --

MS. SHAPIRO: I would actually like to ask people who participated, or who sat and listened, are there people who want to submit written comments?

Yes. Is one week enough? Is ten days, is one week enough? Okay.

UNIDENTIFIED SPEAKER: Ten days. Ten days.

MS. SHAPIRO: Oh, wait, ten days somebody wants?

(Laughter.)

(Parties speaking simultaneously.)

MS. SHAPIRO: The person who's going to write them says ten days.

Okay, why don't we say ten days, then, calendar days. That's a good compromise. That's the same as a week.

So, are you amenable to that, Commissioner Rosenfeld?

COMMISSIONER ROSENFELD: Sure.

MS. SHAPIRO: So all written comments commenting on things that you heard today and learned today would be due in ten calendar days.

Which somebody else can figure out, because I'm not going to.

UNIDENTIFIED SPEAKER: The 31st.

MS. SHAPIRO: Thank you. Well, the 31st is a Sunday, so how about Monday, April 1st, but they have to be serious comments.

(Parties speaking simultaneously.)

MS. SHAPIRO: Oh, okay, how about Tuesday?

MR. PENNINGTON: How about the Friday, instead of going that way?

MS. SHAPIRO: Okay, the person who wanted to have it ten days, is Friday the 29th okay?

UNIDENTIFIED SPEAKER: Let's go the next week. Tuesday, the 2nd.

MS. SHAPIRO: Tuesday, the 2nd, is just fine with me. Is that fine with you?

COMMISSIONER ROSENFELD: Yeah.

MS. SHAPIRO: Okay, thank you. Is there anything else that you want to say? Bill, is there anything you want to say?

MR. PENNINGTON: No. Thank you very much for everyone's comments.

(Whereupon, at 12:35 p.m., the workshop was concluded.)

CERTIFICATE OF REPORTER

I, PETER PETTY, an Electronic Reporter, do hereby certify that I am a disinterested person herein; that I recorded the foregoing California Energy Commission Workshop; that it was thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said workshop, nor in any way interested in outcome of said workshop.

IN WITNESS WHEREOF, I have hereunto set my hand this 13th day of April, 2002.